

What is claimed is:

1. A method for the analysis of a target sequence in a first sample,
5 said method comprising:
 - b. contacting the first sample with a mixture comprising:
A mixture of two probes (probe A and probe B), wherein:
 - i) Probe A is comprised of a nucleotide sequence, directed to a region of the
10 target sequence and is labeled with a fluorophore at the end which, upon
hybridization is closest to the adjacent target region for Probe B; and
 - ii) Probe B is comprised of a nucleotide sequence, which cohybridizes to a
region of the target sequence adjacent to the target region of Probe A and is
labeled with a quencher which, upon hybridization is closest to the adjacent
target region for Probe A,
 - 15 b. measuring fluorescence following cohybridization of Probe A and Probe B to
the target sequence, under suitable hybridization conditions, wherein the
presence or amount of target sequence present in the first sample can be
negatively correlated with the fluorescence of the fluorophore on Probe A.
- 20 2. The method of claim 1, wherein the fluorescence is measurably different
than a control.
3. The method of claim 2, wherein the control is a positive control, a negative
control, a no target control or a second sample.
- 25 4. The method of claim 3, wherein the fluorescence is taken to be indicative of
an increase in target concentration, a structural difference between sample and
control target sequences or a change in the state of the target sequence.
- 30 5. The method of claim 4, wherein the structural difference between sample
and control target sequences is at least one of a nucleobase insertion,
nucleobase deletion, genetic polymorphism, splice variation, amplification or
mutation.

6. The method of claim 4, wherein the change in target state is due to at least one of degradation, methylation, folding, hybridization, or association of the target sequence with protein.
- 5 7. The method of claim 1, wherein the target sequence for Probe A and Probe B comprise at least one nucleobase differing from non-target sequences.
8. The method of claim 7, wherein the method is used to detect target sequence in a closed tube (homogeneous) assay.
- 10 9. The method of claim 7, wherein the method is used to detect a nucleic acid comprising a target sequence wherein said nucleic acid has been synthesized or amplified in a reaction occurring in the closed tube (homogeneous) assay.
- 15 10. The method of claim 9, wherein preferred nucleic acid synthesis or nucleic acid amplification reactions are selected from the group consisting of: Polymerase Chain Reaction (PCR), Ligase Chain Reaction (LCR), Strand Displacement Amplification (SDA), Transcription-Mediated Amplification (TMA), Rolling Circle Amplification (RCA) and Q beta replicase.
- 20 11. The method of claim 10, wherein the PCR reaction is an asymmetric PCR reaction.
12. The method of claim 1, wherein the method further comprises contacting
- 25 the sample with at least one blocking probe.
13. The method of claim 12, wherein the method further comprises hybridizing the blocking probe to non-target sequences.
- 30 14. The method of claim 1, wherein the method further comprises detecting, identifying or qualifying the presence or amount of a microorganism in the sample.

15. The method of claim 1, wherein the method is used to detect, identify, or quantitate the presence or amount of one or more species or types of a microorganism in the sample.
- 5 16. The method of claim 1, wherein the method is used to determine the effect of antimicrobial agents on the growth of one or more microorganisms in the sample.
- 10 17. The method of claim 1, wherein the method is used to determine the presence or amount of a taxonomic group of microorganisms in the sample.
18. The method of claim 1, wherein the method is used to diagnose a condition of medical interest.
- 15 19. The method of claim 1, wherein the target sequence is immobilized to a surface.
20. The method of claim 1, wherein Probe A is immobilized to a surface.
- 20 21. The method of claim 1, wherein Probe A is one component of an array.
22. The method of claim 1, wherein Probe A is PNA or LNA.
23. The method of claim 1 or 22, wherein Probe B is a PNA or LNA.
- 25 24. The method of claim 1, wherein Probe A is a nucleic acid comprising LNA.
25. The method of claim 1 or 24, wherein Probe B is a nucleic acid comprising LNA.
- 30 26. The method of claim 12, wherein the blocking probe is PNA or LNA.
27. The method of claim 12, wherein the blocking probe is a nucleic acid comprising LNA.

28. The method of claim 1, wherein at least one of the probes is a linear PNA beacon.
- 5 29. The method of claim 1, wherein the sample comprises a target sequence which is indicative for a genetically based disease or is indicative for a predisposition to a genetically based disease
- 10 30. The method of claim 1, wherein the target sequence is associated with a disease selected from the group consisting of 5-Thalassemia, sickle cell anemia, Factor-V Leiden, cystic fibrosis and cancer related targets such as p53, p10, BRC-1 and BRC-2.
- 15 31. The method of claim 1, wherein the target sequence in a forensic technique such as prenatal screening, paternity testing, identity confirmation or crime investigation.
- 20 32. An array comprising a probe A immobilized to a surface support, wherein cohybridization of pairs of Probe A and Probe B to adjacent target sequences at predetermined locations are suitable for analysis of two or more target sequences present in a sample.
- 25 33. The array of claim 32, wherein the sample further comprises at least one blocking probe.
- 30 34. The array of claim 32, wherein the array is suitable for regeneration by treatment with one or more regeneration catalyst selected from the group consisting of heat, nuclease enzyme and chemical denaturant such as aqueous solutions containing formamide, urea and or sodium hydroxide.
35. The array of claim 32, wherein Probe A is PNA or LNA.
36. The array of claim 32 or 35, wherein Probe B is a PNA or LNA.

37. The array of claim 32, wherein Probe A is a nucleic acid comprising LNA.

38. The array of claim 32 or 37, wherein Probe B is a nucleic acid comprising LNA.

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39. The array of claim 33, wherein the blocking probe is PNA or LNA.

40. The array of claim 33, wherein the blocking probe is a nucleic acid comprising LNA.

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41. The array of claim 32, wherein at least one of the PNA probes is a linear PNA beacon.

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